

## MAP 16 - SITES WITHIN BIOGEOGRAPHIC ZONE 5 (1 of 1)



### OVERVIEW

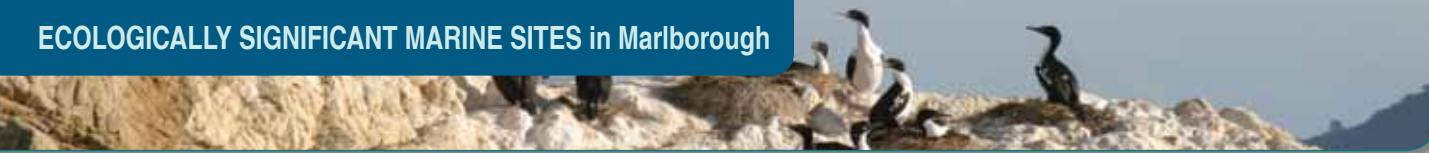
Tory Channel connects the inner Queen Charlotte Sound with Cook Strait. Strong tides flow through this narrow, deep (30-75m) passage. Reefs of outcropping bedrock, small boulders and cobbles fringe the shoreline of the main channel and extend below the tide. Clean, well sorted sands cover more than half of the seafloor below 12-15m. Sediments on the bottom of the main channel are mainly silty and muddy sands and calcareous gravels. There are eight large marginal bays, each of which is considerably shallower than the main channel. Maximum charted depth in Deep, Oyster, Erie and Kawhia Bays is only 6-9m, and in Onepua, Hitaua and Maraetai Bays it is 11-17m. Deep, Erie and Kawhia Bays are distinguished by very shallow (1-3m depth) “bay mouth” bars composed of fine silty sand.

There were a number of whaling stations in Tory Channel between 1827 and 1964. The remains of the Perano station can still be seen in Whekenui Bay. Interisland ferries use Tory Channel and the wake from high-speed ferries in particular has caused shoreline erosion and altered some intertidal and shallow subtidal communities<sup>89,94,100</sup>.

Tory Channel is characterised by its depth and very strong tidal currents. These run up to 7 knots between East and West Heads at the entrance to Cook Strait, and between 1-3 knots through the rest of the Channel. The flow from Cook Strait brings cold, saline, nutrient-rich water into inner Queen Charlotte Sound. The tidal range is approximately 1.5m.

### BIOTA

Macroalgae cover much of the rocky substrata in the main channel. Neptune’s necklace is common in the intertidal zone. Fringing seaweeds found at or just above low water include *Cladophoropsis herpestica*, broccoli weed, narrow flapjack, flexible flapjack, *Cystophora scalaris* and the paddle weed.



Below low water giant kelp, paddle weed and flexible flapjack are dominant. Stands of giant kelp fringe the shoreline along much of the main channel. Below the canopy of kelp there is a diverse under storey of small seaweeds, including *Ulva laetevirens*, sea rimu, sea grape, *Chaetomorpha darwini*, *Halopteris* sp., *Colpomenia* sp., brown tongue weed, *Stenogramme interrupta*, *Chladhymenia oblongifolia*, agar weed, *Pterocladia capillacea*, *Champia novaezealandiae* and *Plocamium costatum*. The red algae *Asparagopsis armata* is a common epiphyte, particularly on large flexible flapjack. There are extensive forests of paddle weed on some reefs, below the lower depth limit of giant kelp.

Common reef invertebrates include jewel anemone, common anemone, speckled anemone, noble chiton, black-foot paua, yellow-foot paua, black sea slug, green topshell, opal topshell, catseye, Cook's turban, common octopus, red rock crab, cushion star, seven-armed star, orange broach star, snake star, sea cucumber, kina and sea tulip. Deep reefs are dominated by crustose coralline algae, sponges, hydroid trees (*Solandaria* sp.), jewel anemones and compound ascidians. Turret shell and the snake star are abundant on these deep reefs and in the sandy areas surrounding them. The eleven-arm star is common on soft sediments below 10m depth. There are horse mussels in Maraetai, Onapua, Erie, Oyster and Te Rua Bays.

Common reef fishes include conger eels, dwarf scorpionfish, sweep, common warehou, butterfly perch, marblefish, yellow-eyed mullet, red moki, tarakihi, blue moki, spotty, banded wrasse, scarlet wrasse, butterflyfish, blue cod, several triplefin (common triplefin, yellow-black triplefin, mottled triplefin, variable triplefin, blue-eyed triplefin, oblique swimming triplefin, spectacled triplefin) and leatherjacket. The hagfish is common at some sites, particularly Whekenui Bay. Hapuku were once a common catch in Tory Channel, particularly in deep water off Dieffenbach Point, but are now rarely seen inside the Sounds.

Common dolphin, dusky dolphin and Hector's dolphin occasionally come into Tory Channel. Humpback whales migrate through Cook Strait and have been sighted in Tory Channel on rare occasions. Large flocks of red billed gulls gather to feed on zooplankton forced to the surface by the strong currents between East and West Heads.

**Table 6 - List of Sites of Significance in Biogeographic Zone 5**

| No. | Biogeographic Zone 5    | Level of information | Representativeness | Rarity | Diversity & pattern | Distinctiveness | Size | Connectivity | Catchment |
|-----|-------------------------|----------------------|--------------------|--------|---------------------|-----------------|------|--------------|-----------|
| 5.1 | Dieffenbach Point       | 1                    | M                  | L      | M                   | M               | M    | L            | L         |
| 5.2 | Tikimaeroero Point      | 2                    | M                  | L      | M                   | M               | M    | L            | L         |
| 5.3 | Hitaua Bay              | 2                    | M                  | L      | M                   | M               | M    | L            | L         |
| 5.4 | Tory Channel - northern | 2                    | H                  | L      | H                   | H               | M    | L            | L         |
| 5.5 | Hitaua Bay Estuary      | 2                    | M                  | L      | M                   | M               | L    | L            | L         |
| 5.6 | Te Pangu Bay            | 4                    | M                  | L      | L                   | M               | L    | L            | L         |
| 5.7 | Deep Bay                | 3                    | M                  | L      | L                   | M               | L    | L            | L         |
| 5.8 | Tory Channel            | 1                    | H                  | L      | H                   | H               | M    | L            | L         |
| 5.9 | Tory Channel entrance   | 1                    | H                  | L      | H                   | M               | M    | L            | L         |

**Key**

1 = Brief visit                      3 = Quantitative report                      H = High                      M = Medium                      L = Low  
 2 = Qualitative report              4 = Personal communication





*Actinotheroe albocincta*  
anemones,  
Dieffenbach Point  
(Roberto D'Archino)

### 5.1 DIEFFENBACH POINT (Subtidal)

Dieffenbach Point is the western headland of Tory Channel where it joins Queen Charlotte Sound, 14.5 km by sea from Picton. The western shoreline south of the Point is swept by moderate tidal currents. There are coarse soft substrata and occasional cobbles at depths of 12-25m.

#### Assessment of ecological significance

There are high densities of the anemone *Actinotheroe albocincta* on cobbles along this stretch of coastline as well as bryozoan mounds dominated by Separation Point coral. Other species living with these mounds include sponges, hydroids, ascidians, molluscs and crustaceans. Bryozoan colonies provide biogenic habitat and food for a variety of reef fish including blue cod<sup>40</sup>.

### 5.2 TIKIMAEROERO POINT (Subtidal)

Tikimaeroero Point is located between Maraetai and Hitaua Bays on the south-west shore of Tory Channel. It is approximately 16 km from Picton. This site is swept by moderate tidal currents, especially on the outgoing tide.

#### Assessment of ecological significance

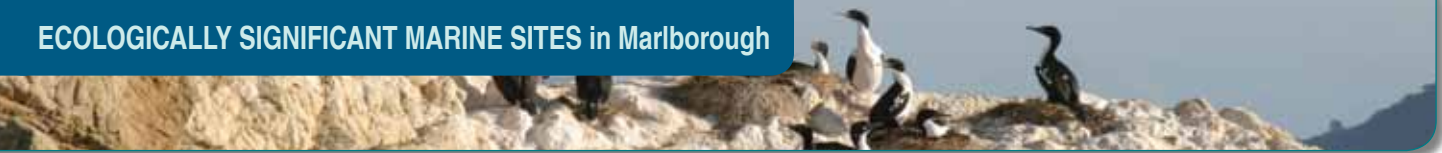
Areas 12-25m deep at this site have coarse soft substrata and occasional cobbles and are colonised by Separation Point coral and a wide variety of associated species. Tidal current habitats such as this are relatively uncommon in Marlborough and provide a habitat for a variety of species<sup>40</sup>.

### 5.3 HITAU BAY (Subtidal)

This site is near the entrance to Hitaua Bay where it meets Tory Channel. It is approximately 17 km from Picton.

#### Assessment of ecological significance

This site consists of a variety of biogenic habitats including bryozoan mounds and associated hydroids, sponges (*Callyspongia* spp., *Crella incrustans*) and ascidians<sup>93</sup>. The anemone *Epiactus* sp. is found in soft sediment between the bryozoan mounds.



#### 5.4 TORY CHANNEL WESTERN COAST NORTH (Subtidal)

There are a number of tidal current communities located along the northern coast at the western end of Tory Channel. These include a 2.8 km stretch of coast from Ruaomoko to Ngaionui Point, a small area at Wiriwaka Point, and an area between Tokakaroro and Te Uira-Karapa Points. The steep seafloor of bedrock, boulder, cobble and shelly habitats are swept by strong and regular tidal currents on the incoming and outgoing tides.

##### Assessment of ecological significance

All these communities are dominated by habitat forming bryozoan mounds, hydroids, sponges (*Callyspongia* spp., *Crella incrustans*) and ascidians. Large schools of butterfly perch and tarakihi have been observed associated with these biogenic habitats.

#### 5.5 HITAU BAY HEAD (Intertidal and Shallow Subtidal)

Hitau Bay is located on the southern shoreline of Tory Channel, towards the western entrance to Queen Charlotte Sound. It has 5km of coastline, a sea area of 84.6 ha, and is approximately 920m across the bay mouth. Hitau Bay is 18 km by water from Picton and 15 km from Cook Strait.

##### Assessment of ecological significance

The head of Hitau Bay has a small freshwater wetland and a tidal wetland that grades into salt marsh<sup>96</sup>. There are small areas of sea grass on the eastern side of this and extensive cockle beds in the shallow subtidal zone. This is one of the few estuaries in Tory Channel.

#### 5.6 TE PANGU BAY (Subtidal)

Te Pangu Bay is a wide bay located along the southern coast of Tory Channel. It has 2.3km of coastline, a sea area of 37.2 ha, and is approximately 970m wide at the bay mouth. Te Pangu Bay is 8.4 km by water from the Cook Strait entrance to Tory Channel.

##### Assessment of ecological significance

A stretch of coastline towards the eastern end of Te Pangu Bay is swept by strong tidal currents. This rocky coast supports a variety of filter feeding species including hydroids, sponges and ascidians.

#### 5.7 DEEP BAY (Subtidal)

Deep Bay is a long, narrow bay located on the southern coast of Arapawa Island, midway along Tory Channel. Its coastline is approximately 2.8 km long, its area is 39.8 ha, and it is 390 m wide across the mouth. It is 6.2 km by water from the Cook Strait entrance to Tory Channel.

##### Assessment of ecological significance

There is a cockle bed at the head of Deep Bay<sup>95</sup>. It is low density compared to other areas in Tory Channel but individual cockles are extremely large and therefore of scientific interest.



Eel grass (Rob Davidson)



**5.8 TORY CHANNEL EASTERN NORTH COAST (Subtidal)**



Tory Channel hydroid community (Cawthron)

Tidal current communities on rock, boulder and cobble substrata have been recorded at seven locations along the northern coastline between Deep Bay and Whekenui Bay. These communities are on outcrops and headlands where tidal currents are strongest.

**Assessment of ecological significance**

These communities are dominated by dense colonies of hydroids, many of them large. This dense hydroid dominated community is found nowhere else in Marlborough. Hydroid trees (*Solandaria* sp.), bushy bryozoans, sponges, zooanthids, macroalgae and ascidians are common.

**5.9 TORY CHANNEL ENTRANCE (Subtidal)**



Tory Channel East Head (MDC)

The eastern entrance to Tory Channel between East and West Head is approximately 640m wide. The entrance is mostly hard substratum swept by very strong tidal currents.

**Assessment of ecological significance**

The biology of this area is poorly known but encrusting species such as bryozoans, hydroids, zooanthids and sponges cover a high percentage of the seafloor. This site is one of the best examples in Marlborough of a habitat subject to very strong tidal currents. Strong tidal current habitats such as this are relatively rare nationally.



6 PORT UNDERWOOD

MAP 17 - SITES WITHIN BIOGEOGRAPHIC ZONE 6 (1 of 1)



**OVERVIEW**

Port Underwood is a large coastal inlet approximately 10 km long with two arms (east and west) and a highly indented coastline. The coastal land is steep and the shoreline is a mix of cobbles and small reef platforms that extend 10-40m offshore. There are small sandy beaches at the head of several bays.

Port Underwood is relatively shallow with maximum charted depths of 11-15m for most of the bay, however the eastern arm is slightly deeper at 13-18m. Rocky substrates extend to 6-8m depth. A narrow band of silty-shell gravel is generally found beyond reef platforms and cobble banks before a change to soft mud at approximately 9m depth. There are mussel farms in both arms of the bay and pine plantations cover much of the catchment.



The hydrology is similar to Cloudy Bay. Circulation in Port Underwood is dominated by moderate tidal and wind-generated currents. Water clarity varies, but can be particularly poor when southerly winds push flood waters from the Wairau River into the Port. There are no major freshwater discharges directly into Port Underwood.

## BIOTA

There are often large beds of the introduced blue mussel and the native green-lipped mussel on the intertidal reefs. Most reefs are fringed with narrow flapjack at low water. Below this flexible flapjack, paddle weed and giant kelp are the dominant seaweeds. Bull kelp is absent, and strap kelp is restricted to a few sites close to the heads. Rock lobsters are abundant although generally small. Larval rock lobsters settle on mussel lines resulting in some areas less than 4 m deep having large numbers of juveniles present. Black-foot paua are common on reefs in the western arm and outer part of the bay. Other common molluscs include several species of chiton, green topshell, catseye and black sea slug. Pacific and rock oysters are common on some reefs and artificial substrates. Also common on subtidal reefs are several species of solitary and compound ascidians, including sea tulip, and a relatively diverse assemblage of anemones (*Metridium* sp., *Oulactis muscosa*, *Isocradactis magna*, *Actinothoe albocincta*, jewel anemone, and an unidentified species with a red column and white tentacles tipped with purple). Serpulid tubeworms, mainly *Galeolaria hystrix*, completely cover much of the reef at The Knobbys and the headland in Whataroa Bay. In places they form a layer of mounds 15m long.

Common reef fish include conger eels, dwarf scorpionfish, sweep, marblefish, yellow-eyed mullet, red moki, blue moki, spotty, banded wrasse, scarlet wrasse, butterfly, blue cod, several triplefins (common, mottled, variable, blue-eyed, oblique swimming, spectacled) and thornfish.

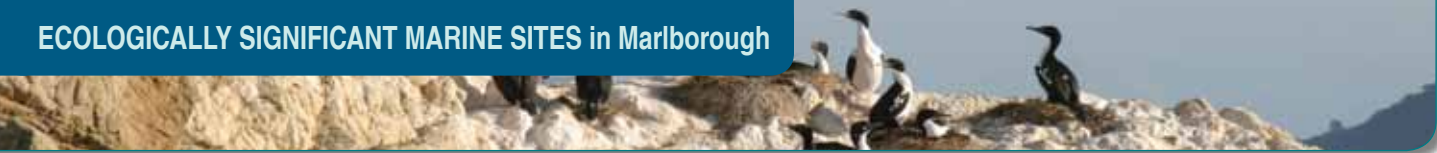
Beds of the red algae *Adamsiella chauvini* and *Rhodymenia linearis* are present on mud in 9–12m depth. Fan worm (*Branchiomma* sp.), spoon worm, large whelk, Arabic volute, olive shell, horse mussel, scallop, sea cucumber and heart urchin are also common in muddy habitats. Some sandy beaches at the head of the Port support small populations of large cockles.

Fish occurring over the muddy sea floor include school shark, spotted spiny dogfish, rough skate, large conger eel, red cod, rat tail, small hake, ling, opal fish, common warehou, tarakihi, giant stargazer, sand flounder, yellowbelly flounder, greenback flounder and lemon sole. Rough skate breed in the Port. It is unusual to find outer shelf and deepwater species such as rat tail, hake, ling and giant stargazer in shallow coastal bays. The presence of these species is probably due to the proximity of Port Underwood to the Cook Strait canyon.

Common pelagic species include barracouta, kahawai and jack mackerel. At times juvenile barracouta 15-30cm long are abundant. Summer migrants include thresher sharks, bronze whaler, blue shark, kingfish and trevally. The Port sometimes suffers algal blooms of *Gymnodinium catenatum* that cause paralytic shellfish poisoning.

Orca and bottlenose dolphin visit occasionally. Shore whaling for southern right whale was undertaken from Port Underwood and Cloudy Bay, and several whaling stations operated in the Port between 1827 and 1840. Cloudy Bay was an important calving area for southern right whales.

Exotic marine species other than blue mussels include the small tropical seaweed *Chnoospora minima*<sup>285</sup> (established between Hakana and Kanae Bays) and the nudibranch *Polycera hedgpethi* (found among bryozoans on mussel buoys).



**Table 7 - List of Sites of Significance in Biogeographic Zone 6**

| No. | Biogeographic Zone 6 | Level of information | Representativeness | Rarity | Diversity & pattern | Distinctiveness | Size | Connectivity | Catchment |
|-----|----------------------|----------------------|--------------------|--------|---------------------|-----------------|------|--------------|-----------|
| 6.1 | The Knobbys          | 2                    | H                  | L      | M                   | H               | L    | L            | L         |
| 6.2 | Whataroa Bay         | 2                    | H                  | L      | M                   | H               | L    | L            | L         |
| 6.3 | Cutters Bay          | 2                    | M                  | L      | L                   | L               | L    | L            | L         |

| Key                    |                            |  |  |          |            |         |
|------------------------|----------------------------|--|--|----------|------------|---------|
| 1 = Brief visit        | 3 = Quantitative report    |  |  | H = High | M = Medium | L = Low |
| 2 = Qualitative report | 4 = Personal communication |  |  |          |            |         |

**6.1 THE KNOBBYS (Subtidal)**

The Knobbys Reef lies approximately 2.5 km from Ngakuta Bay at the head of the eastern arm of Port Underwood and 6.6 km from the entrance to the Port. It is a shallow ridge dominated by pebbles, coarse sands and broken and dead shells, with rocky outcrops along its length.

**Assessment of ecological significance**

Much of the deeper rock at this site is colonised by very large colonies of tubeworms (*Galeolaria hystrix*) which form mounds up to approximately 3m high<sup>101</sup>. These mounds are some of the largest in Marlborough. This is one of two areas of dense colonies in Port Underwood. The tubeworm mounds form a habitat for a variety of other species<sup>351</sup>. Dense tubeworm colonies are relatively rare in Marlborough.

**6.2 WHATAROA BAY (Subtidal)**

The southern headland of Whataroa Bay is approximately 2.1 km south-west of The Knobbys Reef, along the eastern side of Port Underwood. Whataroa Bay Reef extends north-west of this point.

**Assessment of ecological significance**

The Whataroa Reef is mainly bedrock, submerged ridges and outcrops colonised by large and healthy tubeworm mounds (*Galeolaria hystrix*)<sup>101</sup>. This is one of two areas of dense colonies in Port Underwood. Such large colonies are relatively rare in Marlborough.



**6.3 CUTTERS BAY (Subtidal)**

Cutters Bay is a small bay along the eastern coastline of Port Underwood. It has a 1.5 km coastline, an area of 20.5 ha, and the mouth is approximately 600m wide. Cutters Bay is approximately 8 km by water from Ngakuta Bay at the head of the eastern arm of Port Underwood.

**Assessment of ecological significance**

Dense red algae beds provide an important biogenic habitat for a variety of species<sup>90</sup>.

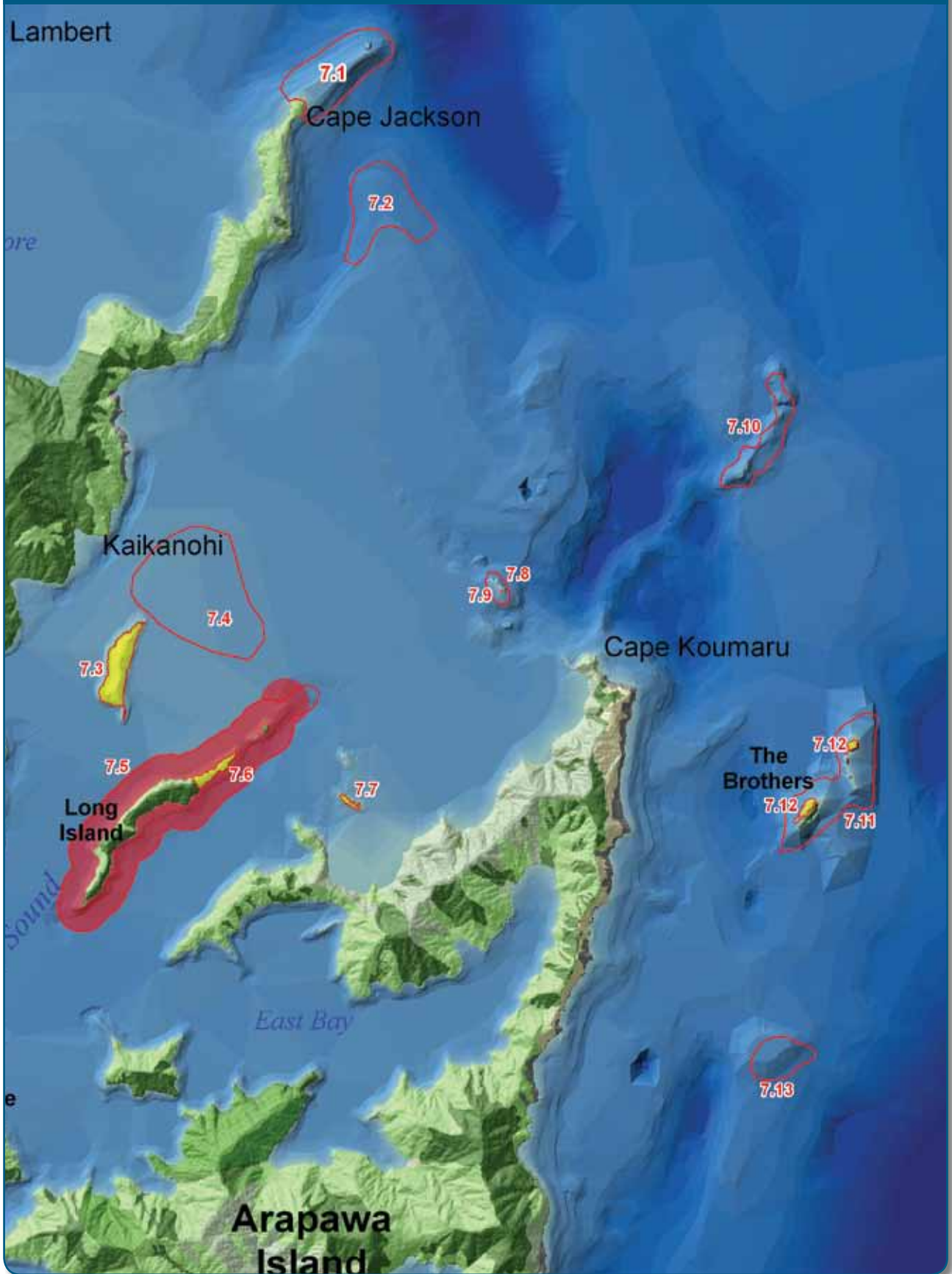
*Red algae, Cutters Bay, Port Underwood (Rob Davidson)*

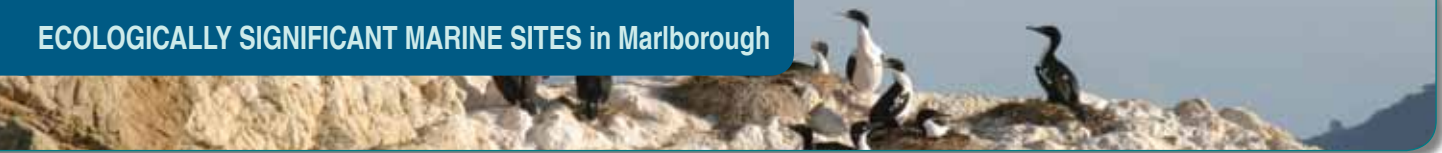




7 CAPE JACKSON TO RARANGI

MAP 18 - SITES WITHIN BIOGEOGRAPHIC ZONE 7 (1 of 2)

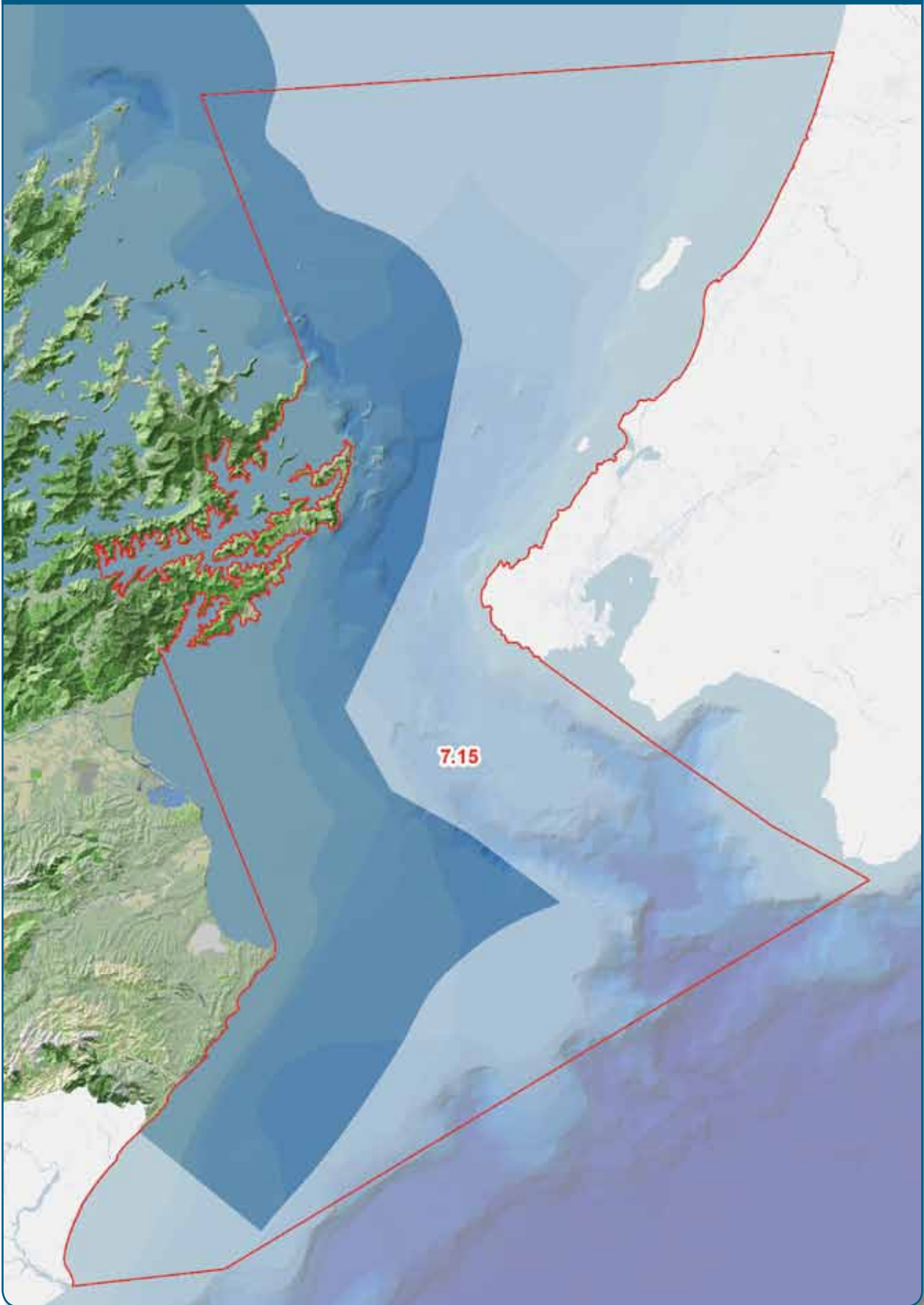




MAP 19 - SITES WITHIN BIOGEOGRAPHIC ZONE 7 (2 of 2)



MAP 20 - SITES OF SIGNIFICANCE FOR WHALES (1 of 1)



## OVERVIEW

The area stretches around the south-eastern coastline of the Marlborough Sounds from Cape Jackson in the north to Rarangi in the south. It is exposed to large southerly swells and has strong tidal currents and cold nutrient-rich waters. It includes Walker Rock off Cape Jackson, Brothers Islands and Awash Rock. The area extends into Queen Charlotte Sound as far as a line bisecting Long Island drawn from Te Ahitaore south of Ship Cove, to Cooper Point on Arapawa Island, and includes the north-east half of the Long Island-Kokomohua Marine Reserve.

High cliffs and gravel beaches dominate the exposed coast. Along much of this coastline rocky reefs drop on to sandy gravel in water 6-18m deep but extend below 60m off headlands such as Walker Rock, Cape Koamaru, Raukawa Rock, Tory Channel entrance, offshore reefs and The Brothers. Most of the seafloor is made up of sandy gravels, medium to large cobbles and broken shells to more than 300m depth. There is little silt in these sediments because of the strong tidal currents but the silt level increases south of Perano Head and into Cloudy Bay as the currents ease. There is a broad shallow sill from approximately 13-30m deep across the mouth of the Queen Charlotte Sound formed by sediment from Cook Strait. The top of the sill is mainly coarse silty sand, while the Cook Strait side includes gravel, sand and calcareous gravel.

The outer Queen Charlotte Sound is popular with boat owners from Picton and Wellington. The outer coast and offshore islands and reefs are important recreational fisheries for rock lobster, blue cod, tarakihi and hapuku; as well as important commercial fisheries for paua, rock lobster, blue cod, hapuku, ling and school shark. There is some commercial scallop dredging in outer Queen Charlotte Sound, and inshore bottom trawlers fish Cloudy Bay and the entrance to Port Underwood. No fishing or anchoring is allowed in the Cook Strait Cable Prohibited Zone that stretches across the Strait and includes Fighting Bay.

Out-of-phase tides enter Cook Strait from the east and west and are reflected after passing through the Cook Strait narrows. This produces small tidal elevations with rapid phase changes and strong tidal currents (1-3 knots) in the narrows. Mean spring tidal range is approximately 1.5m. Strong tidal currents across irregular depths produce strong tidal mixing of the water column. Northerly winds create persistent upwelling off Cloudy Bay and this cold nitrate-rich water extends through the narrows to Cape Jackson and Witts and McManaway Rocks. Warm, low-nutrient D'Urville Current water flows west to east through Cook Strait and mixes with the Southland Current and upwelling water to form the Wairarapa Counter Current. Sea surface temperatures (SST) in this unit are lower than elsewhere in the Marlborough Sounds. Summer SSTs are 14-16°C. Salinity drops and sediments increase in surface water between Rarangi and Coombe Rocks when the Wairau River floods.

## BIOTA

Common open water fish include pilchard, sprat, jack mackerel, kahawai, blue mackerel and barracouta. Trevally and kingfish may appear in summer. Large predators include thresher shark, mako shark, porbeagle and blue shark. Great white sharks are occasionally reported around the New Zealand fur seal haul out on Raukawa Rock. Basking sharks have been seen feeding off Jordy Rocks.

Macroalga diversity is high on the rocky reefs in this area. Narrow flapjack, bull kelp and *Xiphophora chondrophylla* are found in shallow water. There are dense mixed stands of a variety of large brown seaweed from 2-20m depth. Canopy forming species include strap kelp (dominant kelp to 10m at The Brothers), paddle weed, oak-leafed seaweed, flexible flapjack, *Marginariella urvilliana*, *Marginariella boryana*, slender zigzag weed and *Sargassum sinclairii*. Forests of paddle weed grow between Kemp Point and Cape Jackson where the coast is more sheltered from southerly swells. There are stands of giant kelp in outer Queen Charlotte Sound around Motuara Island, on the reef north of Motuara Island, and the reef between Long and Kokomohua Islands and around Motungarara Island. Common subcanopy species include brown halo weed, *Carpomitra costata*, *Zonaria turneriana*, brown tongue weed, *Ulva* spp., coralline turfs, agar weed, *Euptilota formosissima* and *Asparagopsis armata*. Large beds of several species of sea rimu, *Caulerpa articulata*, sea rimu, and *Caulerpa flexilis*, grow in

canopy gaps. Patches of sea grape are also common. Large brown seaweed is rare on the reef at Awash Rock - it is replaced by a mixture of small foliose seaweed (broccoli weed, brown halo weed, *Carpomitra costata*, brown tongue weed, *Arthrocardia corymbosa*, agar weed, *Plocamium costatum*) and a diverse encrusting invertebrate community. These include large sponges, zooanthids, anemones, hydroid trees, colonial cup corals, stalked barnacles and compound ascidians. Rock lobster, black-foot paua, yellow-foot paua and large kina are abundant.

Common reef fishes include hagfish, conger eel, rock cod, southern bastard red cod, sea perch slender roughy, common roughy, sweep, butterfly perch, marblefish, red moki, large blue moki, telescope fish, tarakihi, yellow-eyed mullet, spotty, girdled wrasse, banded wrasse, scarlet wrasse, blue cod, butterfish, triplefin (yellow-black, common, mottled, variable, scaly headed, blue eyed, blue dot, Yaldwin's, oblique swimming, longfinned, and spectacled) and leatherjacket. Hapuku are still common on some deep reefs but have been depleted by intense commercial and recreational fishing. Trumpeter and large snapper also occur on deep reefs. Telescope fish and girdled wrasse are distinctive southern species.

There are at least two invertebrate communities in the sandy sediments in the entrance to Queen Charlotte Sound. The *Austrofuscus-Notocallista* community is found in silty sands and the *Corbula-Terebratella* communities in coarser sand and shell gravel<sup>258</sup>. Common epifaunal species in this area include wandering anemone, scallop, horse mussel, the hermit crab *Paguristes setosus*, kina, pink urchin, cushion star, 11-armed star, snake star and sea cucumber. Half crabs and squat lobsters are common in areas of drift shell. In exposed areas, shallow gravels up to approximately 18m deep are regularly disturbed by waves and have sparse plant or animal life. In contrast, gravel substrates below 18m may have up to 50% cover of seaweeds (*Asparagopsis* sp., *Stenogramme interrupta*, *Euptilota* sp, *Adamsiella chauvini*, *Aeodes nitidissima*, *Ulva* spp.). Epifauna is generally sparse and includes horse mussels, fan worms, sea cucumber and kina. Further down at depths of 170-200m the gravel and cobble in the Cook Strait narrows is dominated by the brittle star *Ophiocoma bollonsi* (density up to 200 m<sup>2</sup>), small sponges, hydroids, anemones, turret shells, fan shells (*Chlamys* sp.), serpulid tubeworms, compound ascidians and the brachiopod *Liothyrella neozelanica*.

Fishes occurring in this area include hagfish, broadnose sevengill shark, spotted spiny dogfish, carpet shark, rig, school shark, electric ray, smooth skate, rough skate, short-tailed stingray, eagle ray, elephant fish, dark ghost shark, red cod, ribaldo, two-saddle rattail, red gurnard, scaly gurnard, ling, hake, hoki, common warehou, silver warehou, bluenose, snapper, tarakihi, spotty, blue cod, spotted stargazer, giant stargazer, opal fish, gemfish, frost fish, witch, lemon sole, common sole, yellowbelly flounder, sand flounder, leatherjacket and porcupine fish.



The rocky coast and islands in this unit attract a variety of seabirds. Sooty shearwater, fluttering shearwater, diving petrel and blue penguin nest in low to moderate numbers on Motuara Island, outer Queen Charlotte Sound. King shags breed on White Rocks in the entrance to Queen Charlotte Sound. Large numbers of fairy prion, diving petrel, shearwater, gull and tern nest on The Brothers Islands. Dusky dolphin and common dolphin are the most often seen marine mammals. Humpback whales migrate through Cook Strait from late May to early August.

*Epiactis anemone* (Rob Davidson)

Table 8 - List of Sites of Significance in Biogeographic Zone 7

| No.  | Biogeographic Zone 7                 | Level of information | Representativeness | Rarity | Diversity & pattern | Distinctiveness | Size | Connectivity | Catchment |
|------|--------------------------------------|----------------------|--------------------|--------|---------------------|-----------------|------|--------------|-----------|
| 7.1  | Cape Jackson and Walker Rock         | 4                    | H                  | L      | H                   | M               | L    | L            | L         |
| 7.2  | Cape Jackson                         | 4                    | ?                  | ?      | ?                   | ?               | ?    | L            | L         |
| 7.3  | Motuara Island                       | 4                    | M                  | M      | L                   | L               | M    | L            | H         |
| 7.4  | North Motuara                        | 4                    | M                  | L      | M                   | M               | M    | L            | M         |
| 7.5  | Long Island-Kokomohua Marine Reserve | 3                    | H                  | L      | H                   | H               | H    | L            | H         |
| 7.6  | Long Island                          | 2                    | M                  | M      | L                   | L               | M    | L            | H         |
| 7.7  | Motungarara Island                   | 2                    | H                  | M      | L                   | L               | M    | L            | H         |
| 7.8  | White Rocks intertidal               | 2                    | H                  | L      | H                   | H               | L    | L            | L         |
| 7.9  | White Rocks                          | 1                    | H                  | H      | L                   | H               | L    | L            | H         |
| 7.10 | Cook Rock                            | 2                    | H                  | L      | H                   | H               | L    | L            | L         |
| 7.11 | Brothers Island intertidal           | 2                    | H                  | L      | H                   | H               | L    | L            | L         |
| 7.12 | Brothers Islands                     | 1                    | H                  | M      | M                   | L               | M    | L            | H         |
| 7.13 | Awash Rock                           | 2                    | H                  | L      | H                   | H               | L    | L            | L         |
| 7.14 | Glasgow Island                       | 2                    | M                  | M      | L                   | L               | M    | L            | H         |
| 7.15 | Cook Strait whale migratory corridor | 3                    | H                  | M      | M                   | M               | M    | NA           | NA        |

**Key**

1 = Brief visit

3 = Quantitative report

H = High

M = Medium

L = Low

2 = Qualitative report

4 = Personal communication

### 7.1 CAPE JACKSON AND WALKER ROCK (Subtidal)

Cape Jackson is a long peninsula that extends into Cook Strait and forms the northern headland of Queen Charlotte Sound. At the tip of Cape Jackson is an extensive reef exposed to large ocean swells and swept by strong tidal currents. Because of this little is known about the subtidal habitats, but limited observations at Walker Rock suggest the area is similar to exposed sites at White Rocks and The Brothers Islands. There is a narrow band of narrow flapjack around the reef at low water. East of Walker Rock there are rocky terraces and pinnacles with clean coarse sand, pebbles and shell in pockets and gutters. Dense paddle weed forest covers the reef at 3-12m depth. Within this there are small patches of oak-leafed seaweed and urchin barrens. Between 12-18m thick mats of sea rimu cover the reef. Seaweed at this depth includes *Carpomitra costata*, *Plocamium costatum* and *Asparagopsis armata*. The erect, branching seaweed *Codium fragile* is also common. Slaty sponge, hydroids, colonial cup corals, zooanthids, jewel anemones and arborescent bryozoans (*Orthoscuticella* sp.) live on vertical faces and beneath overhangs. Fish life on the shallow reef is relatively diverse with at least 19 species seen. Blue cod and wrasse are abundant, also notable are the large schools of the planktivores butterfly perch and telescope fish.

On the east side of Cape Jackson there is a band of the large barnacle *Epopella plicata* at the high water mark. Below this there are bands of gummy weed, *Codium adherens* and *Enteromorpha* sp. narrow flapjack, *Marginariella boryana*, *Zonaria angustata* and green-lipped mussels form a fringe at low water. At 2-5m depth is paddleweed forest, and flexible flapjack forest from 5-11m depth. High numbers of kina create urchin barrens below approximately 11m. The substrate supports crustose coralline seaweed, encrusting sponges, colonial cup corals, jewel anemones, bivalves, and solitary and compound ascidians. The small brachiopods *Waltonia inconspicua* and *Nostosaria nigricans* are abundant. At 21m large boulders and rock outcrops give way to coarse sand.



On the west side of Cape Jackson, bull kelp, narrow flapjack and sparse strap kelp are in low water to approximately 2m depth. Below this is a mixed seaweed forest dominated by flexible flapjack to 12m. From 12-18m there is scattered paddleweed, with turfing red seaweed and mats of sea rimu covering up to 90% of the seafloor. Fish life on either side of the Cape is diverse with at least 30 species present, including the sought-after blue cod, kingfish and tarakihi.

#### Assessment of ecological significance

Offshore rock stacks such as Walker Rock and high current habitats like Cape Jackson are not common in Marlborough. The stacks support distinct groups of species, usually in high abundance. The remote location and regular bad weather limits fishing and netting which allows a rich and diverse range of fish. The range of water depth, wave exposure and good light penetration increases the variety in habitats.

### 7.2 CAPE JACKSON (Subtidal)

Immediately south of Cape Jackson is an area of biogenic habitat forming bryozoan mounds. This area has not been scientifically surveyed and is only known from reports by commercial fishers.

#### Assessment of ecological significance

Dense bryozoan mounds are not common in Marlborough. As dense beds they provide habitat for many other species including reef fish, anemones, sponges and hydroids<sup>40,147,161</sup>.

### 7.3 MOTUARA ISLAND (Terrestrial)

Motuara Island is in the entrance to Queen Charlotte Sounds, 30 km east of Picton.

#### Assessment of ecological significance

Rats have been eradicated from Motuara Island, making it a safe breeding place for seabirds. Reef heron are regularly seen on intertidal reefs around the island. Sooty shearwater and blue penguin breed on the island. Predator free islands provide important breeding habitat for seabirds<sup>152</sup>.

### 7.4 NORTH MOTUARA (Subtidal)

This site covers a large area north of Motuara Island and includes a combination of reefs and soft bottom habitats supporting horse mussel beds. Outcrops of bedrock rise to approximately 4-6 m below the surface from about 9m depth. The top of the reef supports a forest of *Macrocystis* kelp. Below the *Macrocystis* zone<sup>138</sup> the reef is covered in dense turfing red seaweed, coralline crusts, large sponges (*Polymastia fusca*, *Iophon minor*, *Raspalia topsenti*, *Polymastia* sp., pink golfball sponge), *Actinothoe*, large pale colonies of jewel anemone, and brachiopods (*W. inconspicua*). Between 9-12m depth the bottom is soft mud and horse mussels, eleven-arm seastar, sea cucumber and kina are common. The snakestar *Ophiopsammus maculata* is abundant.

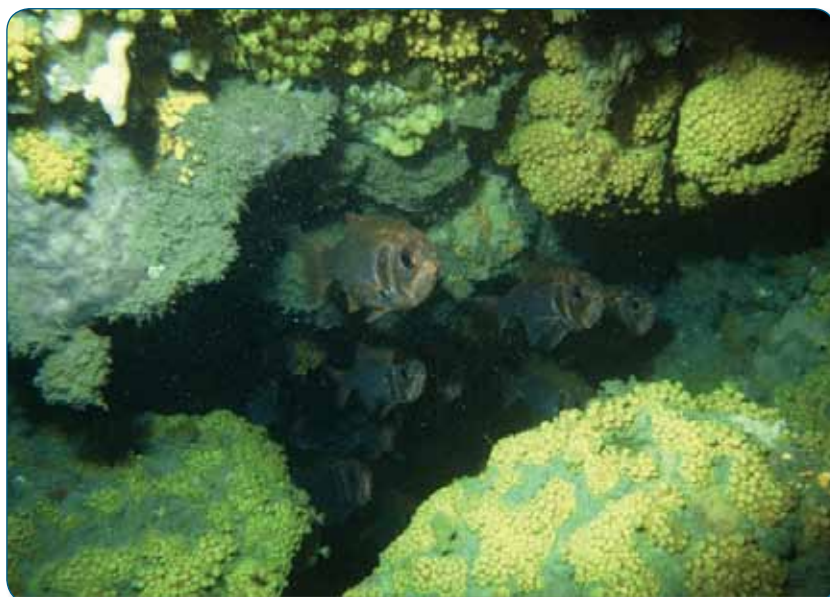
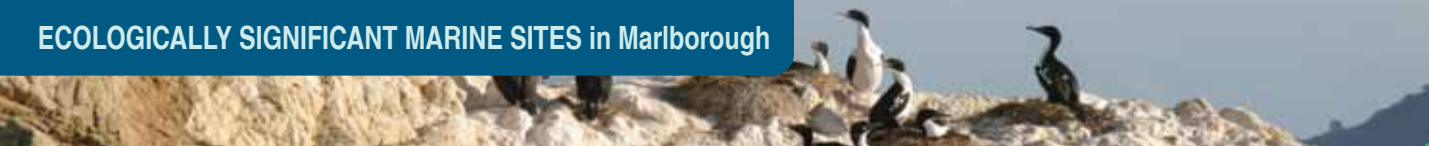
#### Assessment of ecological significance

Beds of horse mussels provide habitat for a variety of species including fish<sup>364,371,372</sup>. There are few of these sites in Marlborough and this is the largest known area of horse mussels in the Cape Jackson to Rarangi biogeographic area.

### 7.5 LONG ISLAND-KOKOMOHUA MARINE RESERVE (Subtidal)

Long Island is in the outer Queen Charlotte Sound. It is approximately 4 km long, 500m wide and covers 142 ha. Kokomohua Island is at the north-east tip of Long Island<sup>88</sup>.

Long Island has been a marine reserve since 1993. In March 2009 rock lobsters were 3.3 times as abundant in the reserve (10.7 individuals per 100m<sup>2</sup>) compared with control sites outside it (3.3 individuals per 100m<sup>2</sup>), and 5.6 times more abundant than 10 years earlier. A 2009 study<sup>91</sup> determined the increase in abundance and size within the reserve was directly related to the rock lobsters being protected from fishing. This would also lead to a greater production of eggs than in the control areas<sup>91,243,244,245,293</sup>.



Rock wall community,  
Cook Strait  
(S de C Cook)

Blue cod are also bigger in the reserve<sup>78,91</sup>. Monitoring since April 2004 has shown that of the 2522 blue cod sampled at control sites outside the reserve, only 1.6% were longer than 330mm, whereas 29.4% were longer than 330mm inside the reserve. Small blue cod (up to 279mm) always dominated the control sites, up to 93% of the population. In contrast, large blue cod (330m-650mm) have dominated the reserve population on four occasions and were second behind the smallest size class for the other 11 occasions<sup>91</sup>. Studies suggest that a large part of the population move relatively small distances resulting in an increase in their density in reserves<sup>64,240</sup>.

### Assessment of ecological significance

Long Island-Kokomohua Marine Reserve is the only marine reserve in Marlborough and one of four in the top of the South Island. Long Island supports a wide variety of habitat types due to its location and combination of sheltered and exposed aspects. This combined with its protected status makes it of high scientific and conservation importance.

#### 7.6 LONG ISLAND (Terrestrial)

A large colony of fluttering shearwater breed on the northern neck of Long Island and small clusters of sooty shearwater are found elsewhere on the island.

### Assessment of ecological significance

Rats have been eradicated from Long Island, making it a safe breeding place for seabirds. The fluttering shearwater colony is the subject of a long-term study by the Ornithological Society in Marlborough.

#### 7.7 MOTUNGARARA ISLAND (Terrestrial)

Motungarara Island is north of Onehunga Bay in the outer Queen Charlotte Sound. The island has a circumference of 1250m, a land area of 3.8 ha, and is approximately 445m long and 125m wide. It is 35 km by sea from Picton.

### Assessment of ecological significance

The island is important as a predator-free breeding site for birds. High numbers of shearwater and little penguin burrow into land to nest wherever suitable substrate is found. Species found on the island include sooty and fluttering shearwater, fairy prion and diving petrel.

#### 7.8 WHITE ROCKS (Subtidal)

White Rocks are located at the entrance of Queen Charlotte Sound 2 km north-west of Cape Koamaru. White Rocks are a series of very small, sparsely vegetated islands and rock stacks, exposed to extreme weather and sea conditions. There is limited biological information for this subtidal area as it is relatively remote and difficult to access.

### Assessment of ecological significance

Like many offshore rocky habitats in Cook Strait, the communities differ from mainland subtidal areas. High currents, wave action and water clarity contribute to a high diversity of encrusting and filter-feeding organisms including sponges, zooanthids, hydroids, ascidians and bushy bryozoans. Virtually all rock surfaces support encrusting invertebrates or algae. Large brown, green and red algae are



found in deep areas. Dominant species include strap kelp, *Marginariella* sp., paddleweed, and oak-leaf seaweed. Extensive beds of green algae (sea rimu, *Caulerpa articulata*) are found in rocky subtidal areas. Zooanthids growing on large sponges (*Ancorina alata*) are abundant at White Rocks.

### 7.9 WHITE ROCKS (Terrestrial)

White Rocks are located at the entrance of Queen Charlotte Sound 2 km north-west of Cape Koamaru. White Rocks are a series of very small, sparsely vegetated islands and rock stacks, extremely exposed to weather and sea.

#### Assessment of ecological significance

This is one of the largest and most important breeding colonies for king shag in Marlborough. During winter surveys in 1992-2002, there were between 120 and 160 birds present<sup>339</sup>. King shags breed at relatively few locations in Marlborough which makes all roosting and breeding sites very important.

### 7.10 COOK ROCK (Subtidal)

Cook Rock reef system is located 5.5 km north-east of Cape Koamaru in Cook Strait. Part of the reef breaks the surface at low tide but most of it is permanently under water. The reef is swept by strong and regular tidal currents. The rocky reef steeply shelves to more than 100m deep. Limited biological information is available as access is difficult.

#### Assessment of ecological significance

Because the area is difficult to fish it supports a high diversity and abundance of adult reef fish. High currents, wave action and water clarity contribute to a high diversity of encrusting and filter-feeding organisms including sponges, zooanthids, hydroids, ascidians and bryozoans<sup>118</sup>. Offshore rock stacks are a relatively rare habitat in Marlborough.

### 7.11 BROTHERS ISLANDS (Subtidal)

The Brothers Islands and rocky stacks are located approximately 5 km east of Cape Koamaru in Cook Strait. The reefs are swept by regular and strong tidal currents, which along with wave action and water clarity contribute to a high diversity of encrusting and filter-feeding organisms including sponges, zooanthids, hydroids, ascidians and bryozoans. Virtually all rock surfaces support encrusting invertebrates. Low water is characterised by encrusting coralline algae, broccoli weed and narrow flapjack. Below the subtidal fringe large patches of sea rimu and strap kelp to approximately 10.5 m depth. Other large brown algae present include oak-leaf seaweed and slender zigzag weed. The understory has broccoli weed, *Zonaria subarticulata*, *Zonaria angustata*, encrusting and branching coralline algae (*Arthrocardia corymbosa*) and agar weed. The reef substratum is densely covered in

turfing brown and red algae (*Halopteris* sp., *Carpomitra costata*, *Rhodophyllis membranacea*, *Euptilota formosissima*, *Asparagopsis armata*), numerous sponges (*Ancorina alata*, orange cup sponge, pink golfball sponge, *Polymastia fusca*, *Latrunculia brevis*), solitary cup corals, speckled anemone, zooanthids, jewel anemone, stony and branching bryozoans (*Celleporaria* sp., *Orthoscuticella* sp.), stalked colonial ascidians (*Hypsistozoa* sp.) and sea tulips.

Rock community,  
Cook Strait  
(S de C Cook)



### Assessment of ecological significance

Like many offshore rocky habitats in Cook Strait, strong currents, wave action and water clarity contribute to a high diversity of encrusting and filter-feeding organisms. Twenty-three species of fish have been identified at this site, along with a variety of seastars including the deep-water pin-cushion star<sup>118</sup>. The Brothers is the largest offshore rocky habitat extending from the deep to the intertidal zone in the Cape Jackson to Rarangi biogeographic area.

#### 7.12 BROTHERS ISLANDS (Terrestrial)

The Brothers Islands and rocky stacks are located approximately 5 km east of Cape Koamaru in Cook Strait.

### Assessment of ecological significance

Diving petrel and fairy prion breed on the two main islands. The site is one of the five largest colonies for these species in Marlborough. During a 1995 survey<sup>151</sup> an estimated 1000 pairs of fairy prion and 600 pairs of diving petrel were counted on North Brother Island. Bird numbers have not been counted on the southern Brothers Island.

#### 7.13 AWASH ROCK (Subtidal)

Awash Rock is a pinnacle 4.4 km south of Brothers Islands and 10.7 km north-east of Tory Channel entrance. The pinnacle only breaks the surface on very low tides and during swell action. The reef habitats are swept by regular and strong tidal currents and exposed to strong waves during frequent storms. The top of the rock is covered in crustose coralline algae, short turfing species (predominantly broccoli weed, brown tongue weed, *Carpomitra costata*, branching coralline algae, *Plocamium costatum*, agar weed), common anemone, large sessile solitary ascidians and sea tulips to approximately 10.5m depth. Below this the sides of the rock are densely encrusted with large sponges, hydroid trees, colonial cup coral, jewel anemones and zooanthids (*Parazoanthus* sp.), stalked barnacles, stalked colonial ascidians (*Hypsistozoa* sp.) and sea tulips. There are dense beds of turfing algae (*Halopteris* sp., *Carpomitra costata*, *Plocamium costatum*) and kina at 24m depth. Reef fish are abundant and the site is notable for large schools of butterfly perch, telescope fish and red moki. Blue cod and rock lobster are also abundant. This site also supports a diverse sea-star assemblage with the large conspicuous *Stichaster australis* and seven-armed star and at least three smaller species common down to 24m.

### Assessment of ecological significance

High currents, wave action and water clarity contribute to a high diversity of encrusting and filter-feeding organisms. The isolated offshore rocky stacks in Cook Strait offer habitats different to mainland subtidal areas and represent a relatively rare habitat type.

#### 7.14 GLASGOW ISLAND (Terrestrial)

Glasgow Island and its small rock stack are on the outer eastern coast of the Marlborough Sounds, 11 km south-west of the entrance to Tory Channel. Glasgow Island has a circumference of 520m, an area of 1.90 ha, is 170m long and 144m wide.

### Assessment of ecological significance

Sooty and fluttering shearwater nest on the island. Like most islands in the study area, its separation from the mainland makes it important for seabirds. Although a considerable distance offshore, it is within stoat swimming range.

#### 7.15 COOK STRAIT WHALE MIGRATORY CORRIDOR (Subtidal) (Map 20)

The Cook Strait is part of a migratory corridor along the NZ coast for humpbacks, as they move north from Antarctic feeding grounds to tropical waters for calving and breeding during the winter months (May - August). The Cook Strait is also utilised by other large whales including southern right whales (winter months), blue whales (possibly all year round but very little known about this species distribution) and sperm whales (probably all year round in the deeper waters of the Strait i. e., 300m and below).



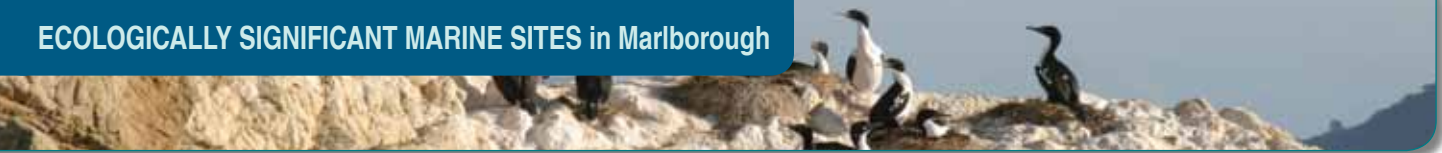
**Assessment of ecological significance**

Humpback whales in New Zealand are part of the Oceania subpopulation and in 2008 were recently reclassified by the International Union for Conservation of Nature (IUCN) as Endangered. They were previously classed as Vulnerable but research on the Oceania subpopulation has indicated this population is more threatened than previously thought. The Department of Conservation has conducted systematic annual surveys of humpbacks as they migrate through Cook Strait during the winters of 2004 to 2010, as well as collecting anecdotal sightings of humpbacks all year round to improve our understanding of the distribution and abundance of these species in New Zealand waters. Nationally endangered southern right whales are also seen in New Zealand coastal waters, including the Cook Strait, in winter months. The New Zealand subpopulation of southern right whales is thought to be very small, with potentially as few as four to eleven breeding females<sup>294</sup>.

Other marine mammal species that have been observed utilising the Cook Strait area include sperm, minke and blue (endangered) whales as well as orca (Nationally Critical), common, dusky, bottlenose (nationally endangered) and Hector’s (nationally endangered) dolphins.



*Bottlenose dolphins  
(MDC)*

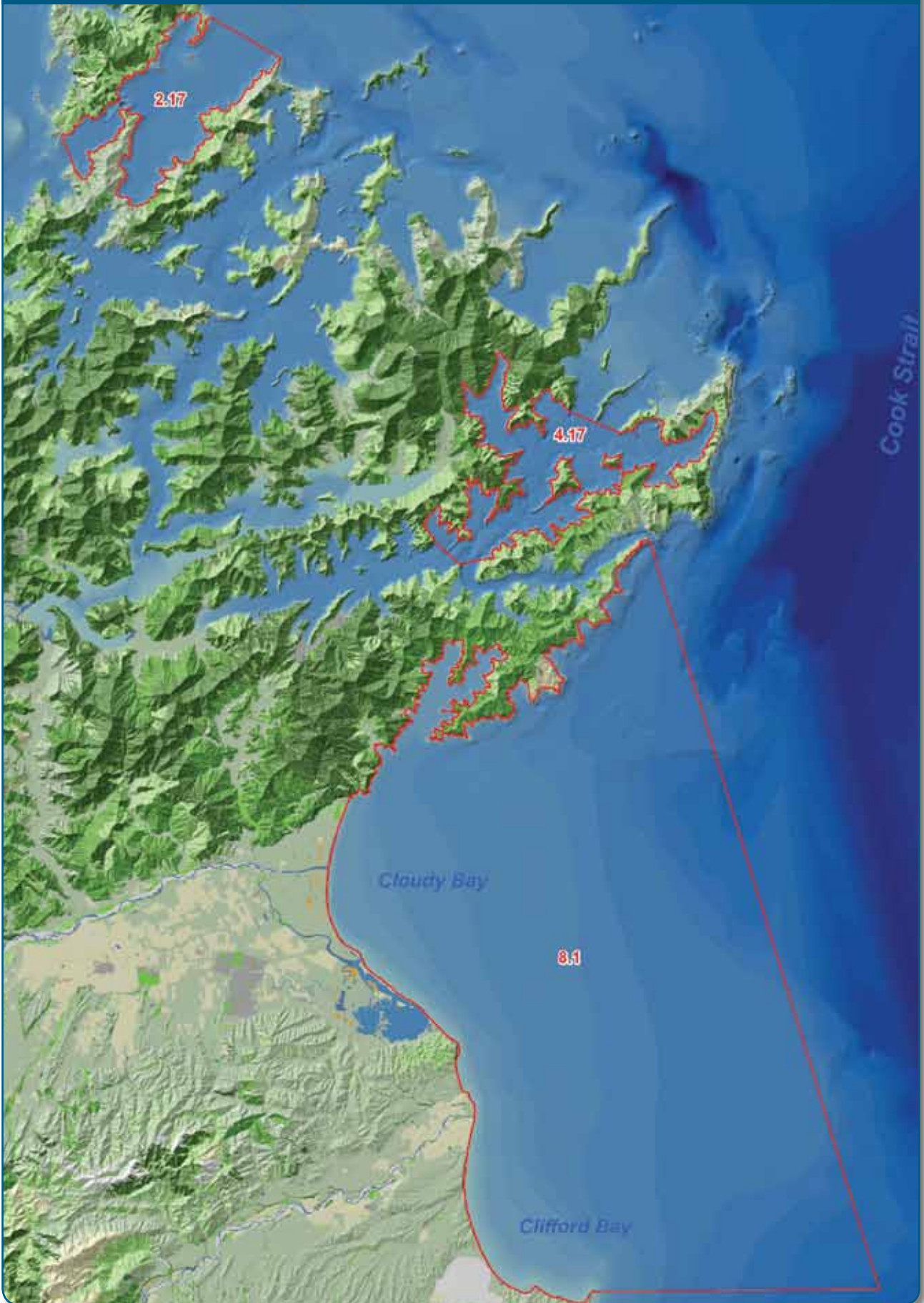


8 CLOUDY AND CLIFFORD BAYS

MAP 21 - SITES WITHIN BIOGEOGRAPHIC ZONE 8 (1 of 1)



MAP 22 - SITES OF SIGNIFICANCE FOR DOLPHINS (1 of 1)



## OVERVIEW

This coastal unit extends north-west from Cape Campbell and includes both Clifford Bay in the south and Cloudy Bay in the north. The northern boundary is at Rarangi, where the mixed sand and gravel beaches of Cloudy Bay stop abruptly and the hard, indented shores of the Marlborough Sounds begin. There are reefs at Mussel Point and Cape Campbell. Cape Campbell is particularly notable for its cliffs and large mudstone shore platforms. The shore near the cliffs at White Bluffs is dominated by cobbles. Elsewhere the coast is dominated by mixed sand and sand/gravel beaches. Offshore is sand and mud and beyond that are gravels. Inshore the mobile sediments cover and uncover siltstone bedrock. Cook Strait weather and tides influence Clifford and Cloudy Bays, which are exposed to the north-east. Waters are generally derived from the cold Southland current which travels up the east coast of the South Island. Cape Campbell provides some protection from the south; however, southerly swells refract around the Cape and send waves on to this coast. Waves and currents can be strong but storms are infrequent.

Water clarity is generally very poor due to flooding from the Wairau and Awatere Rivers, softer rock types such as limestone and siltstone along the coast, and sediment run-off.

## BIOTA

The exposed areas of low-lying subtidal bedrock in the lee of Cape Campbell support moderately diverse animal and plant life, especially encrusting species such as sponges, ascidians and bryozoans. Of particular note is a newly recorded bryozoan species for New Zealand, *Parkermavella* n.sp. A bed of giant kelp is found further north in isolated and scattered patches. Dense beds of red algae grow in the shallow subtidal zone.

Surf clams (large trough shell, trough shell, triangle shell, deepwater tuatua, ringed *Dosinia*, fine *Dosinia* and frilled venus shell) are found close to shore, while offshore the sediments support shellfish and mobile invertebrates typical of much of the east coast of the South Island. Bryozoans are on offshore sediment areas in southern Clifford Bay, and may have been dislodged from nearby reefs. A recent NIWA survey found a bryozoan (*Bagula cuspidata*) which previously had been recorded only in Spirits Bay, Northland.

A significant feature of this coastal unit is the large estuary of the Wairau River and Vernon Lagoons. This tidal area is sheltered by the Wairau Bar and Boulder Bank and is notable for its expansive salt-marsh flats (dominated by glasswort and fringed by rushes and sedges) and large lagoons. Fish that live in or use the lagoons at some stage in their life cycle include flounder species, yellow-eyed mullet, eels, whitebait, smelt and bullies.

Hector's dolphins are found in Cloudy and Clifford Bays. There is also diverse birdlife due to the Wairau and Vernon lagoons. Wetland species include banded dotterel, pied and black stilt, wrybill, plover, terns, gulls, cormorants and waterfowl. A breeding colony of Royal spoonbill is present. Fewer seabirds are seen inshore but albatross, fluttering and sooty shearwater, fairy prion, gannet, gulls, terns and spotted shag are all regularly present.

**Table 9 - List of Sites of Significance in Biogeographic Zone 8**

| No.                    | Biogeographic Zone 8     | Level of information       | Representativeness | Rarity | Diversity & pattern | Distinctiveness | Size       | Connectivity   | Catchment |
|------------------------|--------------------------|----------------------------|--------------------|--------|---------------------|-----------------|------------|----------------|-----------|
| 8.1                    | Cloudy and Clifford Bays | 2                          | H                  | H      | L                   | M               | H          | H <sup>4</sup> | NA        |
| 8.2                    | Wairau Lagoon            | 3                          | H                  | H      | H                   | H               | H          | L              | L         |
| 8.3                    | Lake Grassmere           | 1                          | M                  | M      | M                   | L               | L          | L              | L         |
| <b>Key</b>             |                          |                            |                    |        |                     |                 |            |                |           |
| 1 = Brief visit        |                          | 3 = Quantitative report    |                    |        | H = High            |                 | M = Medium |                | L = Low   |
| 2 = Qualitative report |                          | 4 = Personal communication |                    |        |                     |                 |            |                |           |

### 8.1 CLOUDY AND CLIFFORD BAYS (Subtidal)

This area covers both Cloudy and Clifford Bays and includes Cape Campbell north to the entrance of Tory Channel. Cloudy and Clifford Bays are home to a resident population of Hector's dolphin, estimated at 900<sup>393</sup>. A marine mammal sanctuary covers the area outside a line 12 nautical miles east of Cape Campbell to West Head at Tory Channel. This area essentially covers all the water within the 100m depth contour.

#### Assessment of ecological significance

Hector's dolphin is an endemic, endangered species. Cloudy and Clifford Bays support more individual dolphins than any other area in Marlborough. It is an important area because the dolphins are here for most of the year, although numbers drop in winter, and it remains a mystery where they go<sup>393</sup>. The primary area for the dolphins is between the mouths of the Wairau and Awatere Rivers, and offshore as far as the 100m depth contour. Secondary areas extend north to Rununder Point and south to Cape Campbell, and out to the 100m depth contour. Dolphins are seen occasionally in Port Underwood.

### 8.2 WAIRAU LAGOON (Intertidal, Subtidal and Terrestrial)

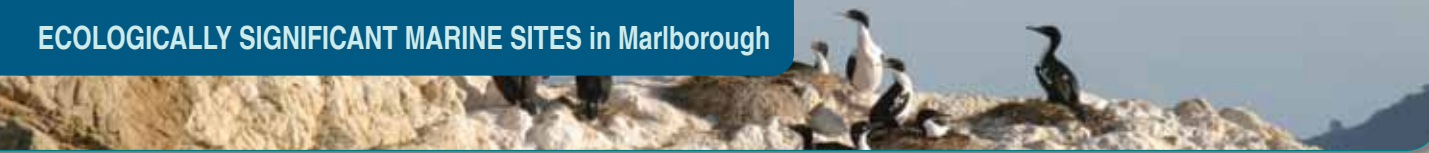


Wairau Lagoon  
(MDC)

The Wairau Lagoon, east of Blenheim, consists of 2300 ha of tidal estuary and coastal wetlands, including a number of low-lying islands. The dominant vegetation is glasswort, various species of sedge, rush and introduced grasses. The Boulder Bank, which acts as a barrier between the Lagoon and Cloudy Bay, has been formed by river gravels swept north from the Awatere River. There have been few fishery investigations of the lagoons, although 22 fish species are known to use the area<sup>213</sup>. Little now remains of the freshwater wetlands that would have once adjoined the estuary as diversion of the Wairau River has altered the natural function of the lagoons. This, combined with enrichment and increased sedimentation, has changed the habitats<sup>212</sup>.

#### Assessment of ecological significance

The Wairau Lagoons is the largest and biologically most important estuary on the east coast of the South Island. Almost 90 species of birds have been recorded in the area<sup>213</sup>. Approximately 77% are either endemic, self-introduced migrants, or native to New Zealand. Some 27% are either endangered, vulnerable or rare<sup>31,190</sup>. Bird species can be divided into four main groups: permanent inhabitants; those visiting for nesting only; those visiting outside the breeding season; and those which use the area occasionally. Important species include breeding Royal spoonbill, black stilt, Caspian tern, banded dotterel and wrybill. The lagoons are an important nursery area for at least two flatfish species<sup>32</sup>. The threatened native herb, musk, is found in the brackish waters on the inland margins of the Lagoons<sup>101</sup>.



### 8.3 LAKE GRASSMERE (Intertidal and Subtidal)



Grassmere  
(MDC)

Lake Grassmere is a large, shallow, tidal lagoon. A smaller tidal lagoon wedged between the foredunes of Marfells Beach and farm pasture is also part of this complex. The main area of Lake Grassmere has been extensively modified by a salt works. The southern and south-eastern shore has large areas of salt marsh and herb-fields.

#### Assessment of ecological significance

Migrating wading birds visit this area, including seldom seen species such as New Zealand dotterel, red-necked stint and red-necked phalarope<sup>101</sup>. Estuaries are not common along the east coast of Marlborough and provide important habitats and stepping stones for domestic and overseas migrating birds.

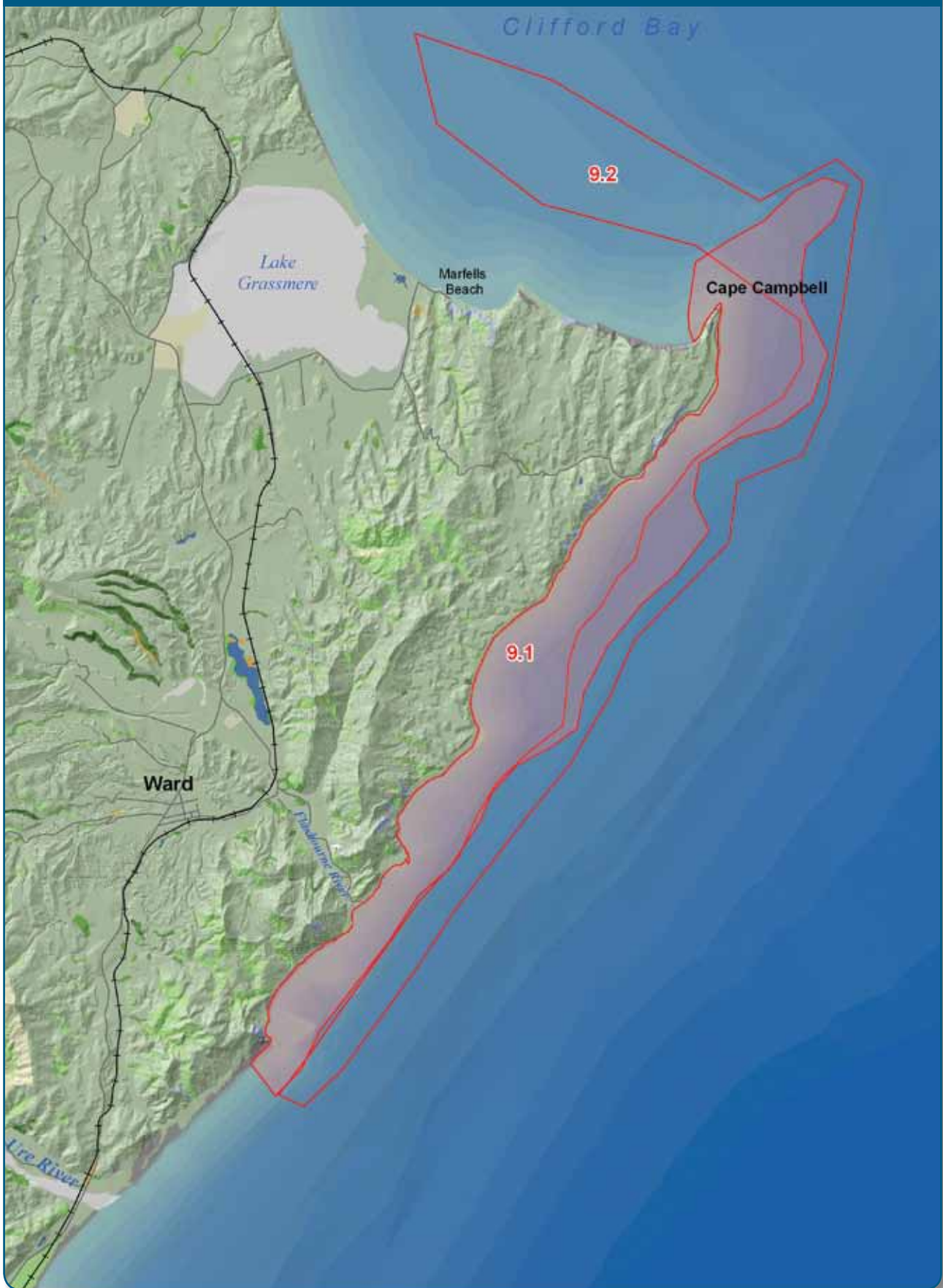




9

SOUTH OF CAPE CAMPBELL TO WILLAWA POINT

MAP 23 - SITES WITHIN BIOGEOGRAPHIC ZONE 9 (1 of 1)



## OVERVIEW

The coastline south of Cape Campbell is relatively straight, with limestone outcrops in the north near Cape Campbell. Cape Campbell itself is notable for its cliffs, large mudstone shore platforms and offshore reefs. Southern areas of the coast have expansive sand and gravel beaches. There are various rocks and reefs along the coast, some connected to the shore, others offshore. The coastal strip is frequently backed by sand dunes and coastal hills.

This area is influenced by the cold Southland Current, and is frequently exposed to high-energy swells and storms from the south and east. Water clarity varies but inshore coastal waters are cloudy due to heavy sediment from the Clarence and Waima (Ure) Rivers further south, as well as the smaller Kekerengu and Flaxbourne Rivers. The softer rock types such as limestone and siltstone along much of the coastline; sediment run-off from modified catchments and the coast's exposure to southerly storms also contribute to the poor water clarity.

## BIOTA

Most information on the ecology of this coast is for the intertidal zone; little is known about the subtidal communities. There is limited marine life on the beaches, although driftwood and seaweed on the upper shore support amphipods and other wrack zone species. Because these shores are so exposed there is also likely to be low diversity and few species in the immediate surf zone. Offshore, beyond the influence of wave action, the more stable sediments are likely to support fauna typical of much of the South Island east coast<sup>344,347</sup>.

Reef communities are less diverse than those further south around Kaikoura and are more prone to sediment movement and scouring sands. A variety of encrusting and mobile invertebrates such as barnacles, limpets, chitons, gastropods, topshells and bivalves live in the intertidal zone, while moderately diverse seaweeds grow from mid-tide down to low water, including neptunes necklace, *Cystophora* spp., *Corallina*, coralline paint, *Glossophora* and *Carpophyllum* spp. Bull kelp is abundant and fringes rocky reefs at low water. The giant kelp is also distinctive, with large offshore beds near Cape Campbell.

Dusky dolphins are found offshore, with small groups of Hector's dolphins inshore. Large whales migrate through these waters and there are small isolated New Zealand fur seal haul-outs at suitable rocky sites. Offshore the bird species are comparable to those found off the Kaikoura Coast.

**Table 10 - List of Sites of Significance in Biogeographic Zone 9**

| No.                    | Biogeographic Zone 9                 | Level of information       | Representativeness | Rarity   | Diversity & pattern | Distinctiveness | Size | Connectivity | Catchment |
|------------------------|--------------------------------------|----------------------------|--------------------|----------|---------------------|-----------------|------|--------------|-----------|
| 9.1                    | Cape Campbell to Ward Beach          | 2                          | H                  | H        | M                   | M               | H    | M            | L         |
| 9.2                    | Offshore Cape Campbell to Ward Beach | 4                          | H                  | H        | M                   | M               | H    | M            | L         |
| Key                    |                                      |                            |                    |          |                     |                 |      |              |           |
| 1 = Brief visit        |                                      | 3 = Quantitative report    |                    | H = High |                     | M = Medium      |      | L = Low      |           |
| 2 = Qualitative report |                                      | 4 = Personal communication |                    |          |                     |                 |      |              |           |

**9.1 CAPE CAMPBELL TO WARD (Inshore Subtidal)**

Cape Campbell is a prominent headland and is the southern inshore boundary of Clifford Bay. Cape Campbell is approximately 35 km south-east of Blenheim and 7.9 km east of Lake Grassmere. This coastal strip stretches 22.6 km south to just south of Needles Point. The coast is characterised by rocky reefs interspersed by sand or gravel beaches. The biological values of this coast are poorly known.

**Assessment of ecological significance**

Of note are the diverse rocky reef habitats subject to regular wave action and often cloudy water conditions. This stretch of coast is one of three sites where the endemic fish species the mottled brotulid has been found in New Zealand<sup>296,297</sup>.

**9.2 CAPE CAMPBELL TO WARD (Offshore Subtidal)**

There are offshore beds of giant kelp from Cape Campbell south to Ward Beach. Little is known of the biological features associated with these kelp forests.

**Assessment of ecological significance**

This stretch of coast is one of three sites in New Zealand where the endemic mottled brotulid fish has been found<sup>296</sup>.



East coast south of  
Cape Campbell  
(MDC)